CITY OF LINCOLN, NEBRASKA, STANDARD SPECIFICATIONS

Chapter 5

ASPHALTIC CONCRETE CONSTRUCTION

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CHAPTER 5

ASPHALTIC CONCRETE CONSTRUCTION

5.00 GENERAL

Asphaltic concrete mixtures required for surface courses, base courses, overlays, wedge courses, and patching shall be placed as hereinafter specified.

Patching shall be defined as pavement replacement of areas requiring small quantities of asphaltic concrete per placement such as utility crossings and connections to existing streets, or larger quantity placements such as longitudinal cuts for utility work not requiring curb to curb asphalt replacement, and for other similar situations as directed by the Engineer.

5.01 RELATED ITEMS SPECIFIED ELSEWHERE

Chapter 1 Pavement Construction and Reconstruction
Chapter 2 Earthwork
Chapter 4 Portland Cement Concrete Base
Chapter 12 Asphaltic Concrete

5.02 MATERIALS

Asphaltic Concrete shall be of the Superpave class as shown on the Plans or in the Contract Special Provisions and as defined in Chapter 12 of these Specifications. Asphaltic concrete for patching shall be any mixture approved by the Engineer.

5.03 EQUIPMENT

All equipment, tools and machinery shall be adequate for the purpose for which it is to be used, and shall be maintained in satisfactory working condition at all times. The equipment shall be at the work site sufficiently in advance of construction operations to be thoroughly examined and approved by the Engineer. The Contractor shall furnish the necessary accessories, equipment data, and assistance required by the Engineer for making tests and calibrations on equipment.

A. DISTRIBUTORS

Whenever the use of a distributor is required, that piece of equipment shall be manufactured expressly for the purpose of applying heated asphaltic materials by pressure spray applications. Improvised equipment, such as converted road oilers, will not be acceptable. The distributor shall be so designed as to permit the application of heated asphaltic material in a uniform spray without atomization at the rate, temperature, and pressure required. The distributor shall be equipped with a tachometer registering revolutions per minute and so located as to be visible to the driver in order that the driver may maintain the constant speed required for the specified rate of application. The distributor shall be mounted on a motor truck or trailer, equipped with pneumatic tires. The pump shall be equipped with a meter registering the number of gallons (liters) per minute passing through the nozzle and this meter must be visible to the operator. The distributor shall be equipped with an accurate thermometer which indicates the temperature of the asphaltic materials at all times. The distributor shall be equipped with a full-circulating spray bar and shall be provided with hand-nozzles to permit application to areas not accessible to the spray bar. The distributor shall be equipped with a drip tray or other suitable means of preventing the dripping of material after the flow has been shut off.

5.03 EQUIPMENT (Continued)

B. ASPHALT SPREADER AND FINISHER

The mechanical asphalt spreader and finisher shall be self-propelled and shall be designed and equipped to spread upon the prepared surface without segregation of the mixture, a tamped and finished wearing surface of asphaltic concrete free from hollows and humps.

The machine shall be equipped with a hopper to receive the asphaltic concrete as it is dumped from the trucks and shall be designed so as to prevent the mixture from being deposited directly on the base or previously laid courses. The hopper shall have a suitable device to distribute the mix evenly across the full width of the screed. The machine shall be equipped with means of adjusting the thickness of the mat, and the transverse and longitudinal grade. It shall be equipped with a tamping or vibrating screed which shall be operated during the lay-down process to compact the applied material to a uniform density. No part of the machine shall travel on the freshly laid material. There shall be auxiliary attachments for the machine so it shall be operated to lay widths as approved by the Engineer.

C. ROLLERS

The number of rollers furnished shall be not less than two independent units, one being a steel wheeled roller and the other a pneumatic tire roller. In lieu of two rollers, one may be used if it is a vibratory roller with one set of pneumatic tires and with separate controls for energy and propulsion, which produces the specified density and a satisfactory surface.

Wheels of all rollers shall be smooth and free from openings or projections which would mar the surface of the work. They shall be equipped with suitable devices necessary to prevent adhesion of bituminous material to the tires and wheels. The rollers shall be equipped with water tanks for wheel sprinkling devices that extend the full width of each roller, and drip pans designed so as to prevent oil, grease, gas or diesel oil from spilling or dripping onto the asphaltic concrete surface.

D. SURFACE PLANER

The planing machine shall be self-propelled, of sufficient weight, size, power and traction to remove surface irregularities without tearing or displacing of the remaining asphaltic surface or concrete pavement. The cutting edge or drum shall be designed and constructed to permit adjustment to match the existing roadway crown. The machine shall be so designed to permit operation against all curbs, catch basins, inlets and other appurtenances within the work area. The minimum grinding or planing width of the machines shall be 30 inches. Alternate equipment will not be acceptable without prior written approval of the Engineer.

E. TRUCKS

Numbered trucks having tight, clean, smooth beds shall be used for transporting the freshly prepared asphaltic concrete to the site of the work. The beds shall be sprayed, when necessary, to prevent the asphaltic concrete mixture from adhering to the bed, with a minimum quantity of approved lubricant. The equipment used and the frequency of spraying shall be determined by the Engineer.

5.03 EQUIPMENT (Continued)

E. TRUCKS (Continued)

All trucks shall be equipped with a suitable waterproof canvas cover to protect the material as required by the Engineer. Any truck that causes excessive segregation of materials by the action of its spring suspension or other contributing factors, or that causes undue delays, shall not be used for transporting the asphaltic concrete mixtures. All truck beds shall be so constructed that they may be insulated, when necessary. All truck boxes shall be equipped with box vibrators.

5.04 PREPARATION OF EXISTING SURFACE

A. CLEANING

Prior to the application of asphaltic materials on existing base, the surface on which the asphalt is to be placed shall be thoroughly cleaned by means of mechanical sweepers, street flushers, shovels, scrapers, and hand brooms as is necessary to remove all mud, matted earth, dust and other foreign materials. Power brooming shall be conducted in such a manner as to keep dust and debris under control and cause a minimum of disturbance to surrounding areas. Material cleaned from the surface shall be removed and disposed of by the Contractor.

The cost of cleaning the existing surfaces to which asphalt is to be applied shall be considered subsidiary to other items for which payment is made.

B. SURFACE PLANING

Surface planing shall consist of grinding or planing of existing asphaltic or concrete pavements to remove any surface irregularities to within a predetermined specified limit, in accordance with the requirements of these Specifications, at locations shown in the plans, or as directed by the Engineer.

Unless the total street width is to be planed, prior to beginning the operation the Engineer shall indicate all individual areas to be planed. These areas shall be rectilinear, except where existing obstructions prohibit this shape.

Surface planing shall be accomplished without gouging or tearing of the remaining pavement surface. The Contractor shall make as many passes with the planing machine as necessary to remove the surface. Surface planing shall include the grinding of all dissimilar material.

Following the final pass, the planed surface shall be within a tolerance of 1/4 inch when checked with a 10 foot straightedge.

5.04 PREPARATION OF EXISTING SURFACE (Continued)

B. SURFACE PLANING (Continued)

The Contractor shall be responsible for location and protection of all manholes, valve boxes, and all other appurtenances, some of which may be below the surface of the street, and to protect equipment from the danger of striking same. Claims for any and all damages arising from hitting these appurtenances shall be the Contractor's responsibility. The Contractor shall have access to applicable records; however, the Contractor shall not rely upon these records to reveal all such hidden appurtenances.

The Contractor shall be held responsible for all appurtenances in the pavement surface which have been damaged or disturbed by the Contractor. The cost of repairing or replacing these damaged appurtenances shall be made at the Contractor's expense.

The Contractor shall remove all pavement cuttings which result from the performance of this work and deliver them to locations approved by the Engineer.

BASIS OF PAYMENT

When called for in the proposal, the cost of operating the surface planer and the cost of collecting and hauling the pavement cuttings shall be paid for at the contract unit price per hour for each piece of equipment during the time that it is in use. Cleaning required subsequent to the initial removal of the cuttings shall be as provided in Paragraph A above.

When called for in the proposal, SURFACE PLANING, completed in conformance with the plans and Specifications and accepted by the Engineer, shall be measured and paid for at the contract unit price bid per square yard. Such payment shall be full compensation for all surface preparation, planing, removal of materials, labor, tools, equipment, clean up and incidentals necessary to complete the work.

C. CORRECTION OF PAVEMENT FAILURES

After the surface planing and cleaning have been accomplished, the Engineer shall examine the pavement structure to which the asphaltic concrete is to be applied. Any pavement failures shall be repaired as designated by the Engineer.

BASIS OF PAYMENT

The cost of repairing pavement failures shall be measured and paid for at the appropriate unit prices or shall be accomplished as an Extra Work Item.

D. TACKING

This work shall consist of the application of asphaltic materials to previously prepared bases or existing surfaces.

After the surface is completely cleaned and dry it shall have a tack coat of rapid curing cut-back asphalt or emulsified asphalt applied sufficiently in advance of the laying operation to break or cure prior to the application of the surface coat.

5.04 PREPARATION OF EXISTING SURFACE (Continued)

D. TACKING (Continued)

Traffic shall not be permitted on the tack coat without the permission of the Engineer, and the asphalt surface course shall be applied as soon as the tack breaks and the water has evaporated. The rate of application generally should be from 0.05 to 0.2 gallons per square yard, with the rate of application to be approved by the Engineer. Tack or asphaltic cement shall be applied by hand to all vertical edges.

The cost of supplying and applying tack coat will not be measured for payment. It shall be considered subsidiary for other items to which direct payment is made.

E. NON-WOVEN PAVEMENT OVERLAY FABRIC

Non-woven pavement overlay fabric and asphaltic cement sealant shall be placed at locations called for on the plans. This work shall consist of the application of an asphalt sealant and the placement of a non-woven pavement overlay fabric over the entire prepared surface of the pavement to be surfaced or resurfaced with asphalt. Sealants are applied both to seal the existing surface and to provide a cement to adhere to the fabric. Emulsified asphalts are not acceptable for sealant.

Sealant and fabric shall be placed only when the ambient air temperature is 50°F or above. The pavement surface on which the sealant fabric is to be placed shall be dry and free of dirt, debris and other foreign matter. Joint and crack openings of 1/8 inch and larger shall be filled with a suitable material as directed by the Engineer. The asphalt sealant shall be applied with distributor equipment at a rate of 0.25 to 0.30 gallons per square yard. The width of the asphalt sealant application shall be the fabric width plus 2 to 6 inches or the entire width of the pavement to be surfaced. Temperature of the sealant shall be not less than 280°F at the time of application to ensure a uniform spray pattern.

No drilling or skipping shall be permitted. Asphalt drools or spills shall be cleaned from the pavement surface to avoid flushing and possible fabric movement at these asphalt rich areas. Fabric lay-down equipment shall be used for placement of the fabric. Overlap of fabric joints shall be 1 to 3 inches.

Immediately after the placement, the fabric shall be embedded into the asphalt cement sealant with a pneumatic roller, unless otherwise directed by the Engineer. The construction of the asphaltic concrete overlay shall follow closely the placement of the fabric. In the event the sealant bleeds through the fabric before the overlay is placed, the Contractor shall be required to spread a thin layer of sand or asphaltic concrete over the affected areas in order to prevent the fabric from being picked up by the construction equipment. The application of tack coat will not be required on the fabric prior to the placement of the asphaltic concrete unless a delay in the placement of the overlay results in the fabric becoming dry or dirty.

5.05 HAULING AND SPREADING ASPHALTIC CONCRETE MIXTURES

A. HAULING

Clean trucks fully fueled shall be weighed in the morning when starting up and then again in the early afternoon to obtain accurate tare weights. The Engineer may also require re-weighing at any time to obtain new tare weights.

B. SPREADING

Asphaltic concrete used in the construction of sections having a uniform width as shown in the typical cross section of the plans, shall be spread and finished with an approved mechanical spreading and finishing machine. The operation of placing mixtures shall be continuous, as nearly as possible.

The asphaltic concrete mixture shall be dumped in the center of the hopper of the spreading machine. Care shall be exercised to avoid overloading and slopping over of the mixture on the base, pavement, or previously laid asphaltic concrete. The operating speed and depth of strike-off of the spreading and finishing machine shall be regulated so as to produce a well knit, uniform layer of the required compacted thickness.

The asphaltic concrete mixture shall be laid only upon a surface which is dry and free from frost.

When the asphaltic concrete mixture is placed in irregular or narrow sections, intersections, or other areas where it is impractical to spread and finish the mixture by methods previously specified, the Contractor may use other equipment or acceptable hand methods for spreading the mixtures, as approved by the Engineer.

The cost of hauling and spreading the asphaltic concrete mixture shall be considered subsidiary to other items for which payment is made.

5.06 COMPACTING AND FINISHING ASPHALTIC CONCRETE MIXTURES

A. ROLLING

Immediately after spreading, the mixture shall be compacted thoroughly by rolling. The number, weight, types of rollers, sequence of rolling operations and compaction procedures shall be such that the required density and a satisfactory surface are attained consistently while the mixture is in a workable condition.

The initial rolling shall begin as soon as the material will bear the weight of the roller without displacing the material. The final compaction and finishing shall be performed by rollers while the material is still warm and responds to the action of the roller. Rolling shall not be carried on in such a manner or at such a time as will cause shoving or cracking. No additional rolling or compaction will be allowed after density core locations have been marked by the Engineer.

All areas not accessible to the equipment specified shall be compacted and finished by other equipment and methods that will provide a satisfactory surface and the specified density. The completed surface shall be smooth and true and shall conform to the grade, cross section and contour required without any irregularities that exceed 1/8 inch when tested with a 10 foot straightedge. Any defective areas shall be remedied at once as directed by the Engineer.

B. JOINTING

Longitudinal and transverse joints shall be made in such a manner that well bonded and sealed joints are achieved. Joints between old and new pavement shall be made in such a manner as to insure a thorough and continuous bond between the old and new surface

Cold joints shall be painted with a light application of asphalt cement before the adjacent material is placed. When placing surface course, a hot joint between lane placement shall be maintained as directed by the Engineer.

Joints in the surface course shall be formed by any approved method that will produce a dense vertical joint; otherwise the previously laid surface course shall be cut back to its full depth so as to expose a fresh surface, after which the hot mixture shall be placed in contact with it and raked to proper depth and grade.

No measurement or direct payment shall be made for the operations of rolling and jointing asphaltic concrete pavement. The cost thereof shall be considered subsidiary to other items for which direct payment is made.

C. DENSITY AND DENSITY SAMPLES

1. General

During the construction of asphaltic concrete pavement, the Contractor shall obtain core samples from each pavement lift for the determination of density. These samples shall be taken not later than seven (7) days after the date of placement of the asphaltic concrete at locations designated by the Engineer and shall be delivered to the City Testing Lab immediately after removal from the pavement. The samples shall be taken by drilling with a minimum 4 inch diameter core drill. After removal from the pavement, the cores shall not be sawed, trimmed, or modified by the Contractor in any way so that the actual lift thickness may be determined by the Engineer. The surfaces from which the samples have been taken shall be restored by the Contractor with hot asphaltic concrete mixture on the next succeeding date of plant operation but not later than seven (7) days after placement. Density samples shall be tested in accordance with the Nebraska Standard Method of Tests for specific gravity of compressed bituminous mixtures, NDR T 166. The void-less density for each lot sample shall be tested in accordance with the Nebraska Standard method of test for Maximum Specific Gravity of Bituminous Paving Mixtures, NDR T 209.

A minimum of one sample shall be required for each lot of asphaltic concrete. A lot is defined as each 500 tons or fraction thereof of each days production. The location of each of the required samples shall be determined by the Engineer. The % of Payment for each lot of asphaltic concrete shall be in accordance with Table “A” of this Section. The % of Payment in Table “A” shall be reduced by 5% for any lot represented by initial density samples received by the City Testing Lab more than (7) days from date of placement.

C. DENSITY AND DENSITY SAMPLES (Continued)

2. Arterial Streets

The asphaltic concrete for arterial streets shall be compacted to a density of not less than ninety-two and one half percent (92.5%) of the void-less density for that mixture. If any density test result indicates a compaction value of less than ninety-two and one half percent (92.5%) of the void-less density, two additional check cores will be obtained from that lot by the Contractor at points designated by the Engineer not later than 14 days after date of placement and delivered to the City Testing Lab immediately after removal from the pavement as described above. The % of Payment in Table "A" shall be reduced by 5% for any lot represented by check cores received more than (14) days from date of placement. The average density of the three samples shall be considered the density of the lot. In the event a sample is obviously damaged, an alternate sample will be obtained within 3 feet of the location of the damaged sample.

Reduction in payment for each lot of asphaltic concrete will be made according to the following table:

TABLE 'A'

Average Density	Min. # Samples	% of Payment
92.5 and above	1	100
92.0 to 92.4	3	95
91.5 to 91.9	3	90
91.0 to 91.4	3	85
90.5 to 90.9	3	80
90.0 to 90.4	3	70
89.9 or less	3	40 or reject

When the asphaltic concrete is bid as a part of the total pavement structure, the reduction in payment will be based on fifty percent (50%) of the unit bid price for that pavement item on a square yard basis.

Where removal is required, no payment will be made for the asphalt concrete surfacing ordered removed or the cost associated with the removal thereof.

The thickness of the samples shall be the average of four measurements made at four equally spaced locations on the perimeter of the sample. When the nominal layer thickness is either less than 1 inch or less than one and a half times the nominal maximum size of the aggregate contained in the asphaltic concrete mixture, the sampling and testing of density for this layer shall be waived. When the nominal thickness of a layer is greater than 1 inch and also equal to or greater than one and a half times the nominal maximum size of aggregate contained in the asphaltic concrete mixture, the thickness of the density sample or samples shall also equal or exceed these thickness requirements. Density determinations shall be waived for any lot when the maximum thickness requirements are not met by any of three samples taken at random.

C. DENSITY AND DENSITY SAMPLES (Continued)

3. Non Arterial Streets and Parking Areas

The general requirement for Density and Density Samples shall be the same as that for Arterial Streets.

When the asphaltic concrete is bid as a part of the total pavement structure, the reduction in payment will be based on fifty percent (50%) of the unit bid price for that pavement item on a square yard basis.

Where removal is required, no payment will be made for the asphalt concrete surfacing ordered removed or the cost associated with the removal thereof.

No measurement or direct payment shall be made for obtaining core samples for the determination of the density pay factor and layer thickness and restoring the surface. Obtaining core samples and restoring the surface shall be considered subsidiary to the items for which direct payment is provided.

D. ASPHALTIC CONCRETE CURB

When called for on the plans, asphaltic concrete curb shall be constructed of the same type of asphaltic concrete as the adjoining surface course, or as shown on the plans. The asphaltic concrete shall conform to the shape and dimensions that are shown on the plans.

Whenever possible the asphaltic concrete curb shall be shaped and compacted with a curb machine capable of constructing the curb true to line, grade, and cross section and to a density and with a surface texture which is satisfactory to the Engineer.

Special precautions shall be taken to provide a proper bond between the surface course and the curb. The surface shall be thoroughly cleaned and tacked with hot asphalt cement. If performed during cool weather, surface course shall be heated so that it is sufficiently plastic to form a bond with the hot asphaltic concrete curb.

5.06 COMPACTING AND FINISHING ASPHALTIC CONCRETE MIXTURES (Continued)

E. COLD WEATHER PLACEMENT

When weather conditions are expected to adversely affect the temperature of the Asphaltic Concrete during placement and compaction, all haul trucks shall be covered and insulated as directed by the Engineer.

The temperature of the Asphaltic Concrete during placement shall be such that compaction is accomplished within the temperature range as specified by the Asphalt Binder supplier for the grade of binder being used.

Asphaltic Concrete shall not be placed when the ambient temperature during placement is expected to fall below 35°F, without permission from the Engineer.

Asphaltic concrete shall not be placed on frozen or frost covered subgrade or base. Table 'B' shall be used by the Engineer to restrict the routine placement of asphaltic concrete as a result of cold temperatures. Wind velocity, cloud cover, and other project specific conditions will be considered by the Engineer if deviating from Table 'B'.

TABLE 'B'

Lift Thickness	Minimum Surface Temperature
Less than 2 inches	**45°F**
2 to 3 inches	**37°F**
Greater than 3 inches	**35°F**

5.07 BASIS OF PAYMENT

A. NON-WOVEN PAVEMENT OVERLAY FABRIC

Placement of the non-woven pavement overlay fabric shall be measured and paid for at the contract unit price bid per square yard for the item NON-WOVEN PAVEMENT OVERLAY FABRIC. Such payment shall be full compensation for cleaning and preparing the pavement surface, filling joint and crack openings; for furnishing, heating, and applying the asphalt sealant; for placement and rolling of the fabric; for furnishing and applying material for blotting the surface of the fabric as required; and for all equipment, labor, tools, and incidentals required to complete the work.

B. NEW PAVEMENT CONSTRUCTION

1. No direct payment shall be made for the asphaltic concrete surface course on new pavement construction. It shall be considered subsidiary to the price bid for ASPHALTIC CONCRETE PAVEMENT, CLASS 1 or ASPHALTIC CONCRETE PAVEMENT, CLASS 2, as provided in Section 1.03 of these Specifications.

5.07 BASIS OF PAYMENT (Continued)

2. No direct payment shall be made for the asphaltic concrete base course on new pavement construction. It shall be considered subsidiary to the price bid for ASPHALTIC CONCRETE PAVEMENT, CLASS 2, as provided in Section 1.03 of these specifications.

3. Asphaltic concrete curb shall be measured and paid for at the contract unit price bid per linear foot for the item ASPHALTIC CONCRETE CURB.

C. PAVEMENT RECONSTRUCTION

ASPHALTIC CONCRETE used as a surface course, wedge course, overlay, or for patching utility cuts, constructed in conformance to these Specifications and accepted by the Engineer, shall be paid for on a lot basis at the appropriate contract unit price bid per ton. Such payment shall be considered full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the reconstruction in a condition acceptable to the Engineer.

D. RESURFACING

ASPHALTIC CONCRETE used as a surface course, wedge course, or overlay, constructed in conformance to these Specifications and accepted by the Engineer, shall be measured and paid for on a lot basis at the appropriate contract unit price bid per ton. Such payment shall be full compensation for all material, labor, equipment, tools, and incidentals necessary for the manufacture and placement, complete.